NEUROLOGICAL SIGNAL DECODING

ABSTRACT OF THE DISCLOSURE

5   A continuous tracking task and multielectrode recording was used to describe position and velocity information encoding and decoding in primate motor cortex during visually guided hand motion. The pursuit tracking task (PTT) controls hand motion to remove statistical dependencies among kinematics and neural activity, provides reasonable data stationarity, and a broad sample of velocity and position space

10   allowing description of the time varying features of MI tuning for hand motion. MI has a continuous contribution to visually guided hand motion. The amount of information for each cell was low and restricted to the slow components of movement. Decoding using a linear regression method confirms that position and velocity information can be recovered from the firing of ensembles of MI neurons and demonstrates that MI firing

15   contains sufficient information to predict any future hand trajectory with moderate accuracy based on the firing patterns of small numbers of regionally associated MI neuron populations. These results suggest that large populations of MI neurons are engaged in the continuous tracking movements that are guided by vision. They also demonstrate that signals obtained from small populations of MI neurons could feasibly

20   be used to control external devices in paralyzed individuals.